

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. *(Cancelled)*.

2. *(Currently Amended)* The image retrieval device according to Claim 5 [[1]], further comprising an image feature descriptor storing means and wherein said similarity calculating means compares said second group of image feature descriptors of image data of said inquired image received from said second coefficient transforming means with said second group of image feature descriptors of image data contained in said image database read from said image feature descriptor storing means.

3. *(Currently Amended)* The image retrieval device according to Claim 5 [[1]], wherein said first coefficient transforming means and said second coefficient transforming means ~~perform transform of~~ image feature descriptors ~~so in a manner~~ that visual similarity between images to be compared is approximated by a distance between an image expressed by said second group of image feature descriptors of image data contained in said image database and an image expressed by said second group of image feature descriptors of image data of said inquired image.

4. *(Cancelled)*.

5. *(Currently Amended)* An image retrieval device for retrieving an image being similar to an inquired image from images stored in an image database comprising:

a first coefficient transforming means for transforming a first group of image feature descriptors extracted from image data accumulated in said image database and then generating a second group of image feature descriptors to be used for calculating similarity, wherein said second group of image feature descriptors comprise transform coefficients obtained by performing specified transform processing of coefficient on said image data accumulated in said image database;

a second coefficient transforming means for transforming a first group of image feature descriptors extracted from image data of said inquired image and then generating a second group of image feature descriptors to be used for calculating similarity, wherein said second group of image feature descriptors comprise transform coefficients obtained by performing specified transform processing of coefficient on said inquired image; and

a similarity calculating means for calculating similarity by comparing said second group of image feature descriptors for each piece of image data generated by said first coefficient transforming means with said second group of image feature descriptors transformed by said second coefficient transforming means. ~~The image retrieval device according to Claim 4,~~ wherein said first coefficient transforming means and said second coefficient transforming means perform a ~~transform~~ of coefficient transforms using a transform table selected depending

on a kind of transform coefficient to be used as said image feature descriptor and wherein said first coefficient transforming means and said second coefficient transforming means perform retrieval of a similar image on a trial basis using a plurality of said transform tables each having a differently segmented range of said transform coefficient and select a transform table which has showed a high rate of correctly solved retrieval in said trial basis retrieval ~~on said trial basis~~.

6. (*Currently Amended*) An image retrieval device for retrieving an image being similar to an inquired image from images stored in an image database comprising:

16 a first coefficient transforming means for transforming a first group of image feature descriptors extracted from image data accumulated in said image database and then generating a second group of image feature descriptors to be used for calculating similarity, wherein said second group of image feature descriptors comprise transform coefficients obtained by performing specified transform processing of coefficient on said image data accumulated in said image database;

a second coefficient transforming means for transforming a first group of image feature descriptors extracted from image data of said inquired image and then generating a second group of image feature descriptors to be used for calculating similarity, wherein said second group of image feature descriptors comprise transform coefficients obtained by performing specified transform processing of coefficient on said inquired image; and

a similarity calculating means for calculating similarity by comparing said second group of image feature descriptors for each piece of image data generated by said first coefficient

transforming means with said second group of image feature descriptors transformed by said second coefficient transforming means. ~~The image retrieval device according to Claim 4,~~ wherein said first coefficient transforming means and said second coefficient transforming means perform ~~transform of said coefficient~~ transforms in a manner that fine quantization is carried out on a range of a portion of each of said transform coefficients having a small amplitude and that coarse quantization is carried out on a range of a portion of each of said transform coefficients having a large amplitude.

7. (*Currently Amended*) An image retrieval device for retrieving an image being similar to an inquired image from images stored in an image database comprising:

a first coefficient transforming means for transforming a first group of image feature descriptors extracted from image data accumulated in said image database and then generating a second group of image feature descriptors to be used for calculating similarity, wherein said second group of image feature descriptors comprise transform coefficients obtained by performing specified transform processing of coefficient on said image data accumulated in said image database;

a second coefficient transforming means for transforming a first group of image feature descriptors extracted from image data of said inquired image and then generating a second group of image feature descriptors to be used for calculating similarity, wherein said second group of image feature descriptors comprise transform coefficients obtained by performing specified transform processing of coefficient on said inquired image; and

A1
a similarity calculating means for calculating similarity by comparing said second group of image feature descriptors for each piece of image data generated by said first coefficient transforming means with said second group of image feature descriptors transformed by said second coefficient transforming means. ~~The image retrieval device according to Claim 4,~~ wherein said first coefficient transforming means and said second coefficient transforming means perform ~~a transform of said coefficient~~ transforms in a manner that fine quantization is carried out on said coefficient having a small power and coarse quantization is carried out on said coefficient having a large power.

8. *(Currently Amended)* The image retrieval device according to Claim 6, wherein said first coefficient transforming means and said second coefficient transforming means perform a ~~transform of said coefficient~~ transforms in a manner that fine quantization is carried out on said coefficient having a small power and coarse quantization is carried out on said coefficient having a large power.

9-10. *(Cancelled).*

11. *(Currently Amended)* An image retrieving method for retrieving an image being similar to an inquired image from images stored in an image database, said method comprising:
transforming a first group of image feature descriptors extracted from image data accumulated in said image database and then generating a second group of image feature

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. APPLN. NO. 09/732,701
ATTORNEY DOCKET NO. Q62251

descriptors to be used for calculating similarity, wherein said second group of image feature descriptors comprise transform coefficients obtained by performing specified transform processing of coefficient on said image data accumulated in said image database;

transforming a first group of image feature descriptors extracted from image data of said inquired image and then generating a second group of image feature descriptors to be used for calculating similarity, wherein said second group of image feature descriptors comprise transform coefficients obtained by performing specified transform processing of coefficient on said inquired image; and

comparing said second group of image feature descriptors of image data accumulated in said image database with said second group of image feature descriptors of image data of said inquired image to calculate similarity,

wherein said specified transform processing ~~The image retrieval method according to Claim 10, wherein, in said two steps in which said first group of image feature descriptors is transformed and said second group of image feature descriptors is generated, a transform of said coefficient is performed using a transform table selected depending on a kind of transform coefficient to be used as said image feature descriptor and wherein retrieval of a similar image is performed on a trial basis using a plurality of said transform tables each having a differently segmented range of said transform coefficient and a transform table is selected which has showed a high rate of correctly solved retrieval in said~~ trial basis retrieval ~~on a trial basis.~~

12. (Cancelled).

13. (*Currently Amended*) An image retrieval device for retrieving an image being similar to an inquired image from images stored in an image database comprising:

a first coefficient transforming means for transforming a first group of image feature descriptors extracted from image data accumulated in said image database and then generating a second group of image feature descriptors to be used for calculating similarity;

a second coefficient transforming means for transforming a first group of image feature descriptors extracted from image data of said inquired image and then generating a second group of image feature descriptors to be used for calculating similarity;

A1 a similarity calculating means for calculating similarity by comparing said second group of image feature descriptors for each piece of image data generated by said first coefficient transforming means with said second group of image feature descriptors transformed by said second coefficient transforming means;

an image size resizing means for resizing image data accumulated in said image database and/or inquired image; and

an image feature descriptor producing means for performing an orthogonal transform on an image obtained by said image size resizing means and producing an orthogonal transform coefficient and using said orthogonal transform coefficient as a first group of image feature descriptors. ~~The image retrieval device according to Claim 12, wherein said image size resizing means comprising is composed of~~ a block dividing means for partitioning said image data into blocks, a dominant color calculating means for calculating a dominant color of each of blocks

obtained by said block dividing means and an image creating means for creating an image using said dominant color of each of said blocks as a pixel.

14. (*Original*) The image retrieval device according to Claim 13, wherein said image creating means extracts a color average of entire pixels contained in each of said blocks as said calculated dominant color of each of said blocks.

15. (*Original*) The image retrieval device according to Claim 13, wherein said block dividing means partitions said image into 64 blocks.

16. (*Currently Amended*) An image retrieval device for retrieving an image being similar to an inquired image from images stored in an image database comprising:

a first coefficient transforming means for transforming a first group of image feature descriptors extracted from image data accumulated in said image database and then generating a second group of image feature descriptors to be used for calculating similarity;

a second coefficient transforming means for transforming a first group of image feature descriptors extracted from image data of said inquired image and then generating a second group of image feature descriptors to be used for calculating similarity;

a similarity calculating means for calculating similarity by comparing said second group of image feature descriptors generated by said first coefficient transforming means with said second group of image feature descriptors generated by said second coefficient transforming

means, wherein said first and second coefficient transforming means each resize image data accumulated in said image database and/or inquired image, ~~The image retrieval device according to Claim 12, wherein said image feature descriptor producing means performs a produce a~~ discrete cosine transform coefficient by performing a discrete cosine transform (DCT) on an entirety of the resized, ^{image} and use image obtained by said image size transforming means and extracts an obtained DCT coefficient and uses said DCT the produced discrete cosine transform coefficient as an extracted a first group of image feature descriptors.

17. (Cancelled).

18. (Currently Amended) An image retrieval device for retrieving an image being similar to an inquired image from images stored in an image database comprising:

a coefficient transforming means for transforming a first group of image feature descriptors extracted from image data accumulated in said image database and from image data of said inquired image and then generating a second group of image feature descriptors used to calculate similarity;

a similarity calculating means for comparing said second groups of image feature descriptors generated by said coefficient transforming means and then calculating similarity between an image accumulated in said image database and said inquired image;

an image size resizing means for resizing image data accumulated in said image database and/or inquired image; and

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. APPLN. NO. 09/732,701
ATTORNEY DOCKET NO. Q62251

21 an image feature descriptor producing means for performing an orthogonal transform on an image obtained by said image size resizing means and producing an orthogonal transform coefficient and using said orthogonal transform coefficient as a first group of image feature descriptors. ~~The image retrieval device according to Claim 17,~~ wherein said image size resizing means comprises ~~is composed of~~ a block dividing means for partitioning said image data into blocks, a dominant color calculating means for calculating a dominant color of each of blocks obtained by said block dividing means and an image creating means for creating an image using said dominant color of each of said blocks as a pixel.

19. *(Original)* The image retrieval device according to Claim 18, wherein said image creating means extracts a color average of entire pixels contained in each of said blocks as said calculated dominant color of each of said blocks.

20. *(Original)* The image retrieval device according to Claim 18, wherein said block dividing means partitions said image into 64 blocks.

21. (*Currently Amended*) An image retrieval device for retrieving an image being similar to an inquired image from images stored in an image database comprising:

a coefficient transforming means for transforming a first group of image feature descriptors extracted from image data accumulated in said image database and then generating a second group of image feature descriptors used for calculating similarity and for transforming a first group of image feature descriptors extracted from image data of said inquired image and then generating a second group of image feature descriptors used to calculate similarity;

a similarity calculating means for comparing said generated second group of image feature descriptors of said image data accumulated in said image database with said generated group of image feature descriptors of said inquired image,

wherein said coefficient transforming means resizes image data accumulated in said image database and/or inquired image, produces a discrete cosine transform coefficient by performing ~~The image retrieval device according to Claim 9, wherein said image feature descriptor producing means performs a discrete cosine transform (DCT) on an entirety of the resized image obtained by said image size transforming means and extracts an obtained DCT coefficient and uses said DCT produced discrete cosine transform coefficient as an extracted a~~
first group of image feature descriptors.

22. (*Cancelled*).

23. (*Currently Amended*) An image retrieving method for retrieving an image being similar to an inquired image from images stored in an image database, said method comprising:

transforming a first group of image feature descriptors extracted from image data accumulated in said image database and then generating a second group of image feature descriptors to be used for calculating similarity;

transforming a first group of image feature descriptors extracted from image data of said inquired image and then generating a second group of image feature descriptors to be used for calculating similarity;

comparing said second group of image feature descriptors of image data accumulated in said image database with said second group of image feature descriptors of image data of said inquired image to calculate similarity;

resizing images accumulated in said image database data and/or inquired image in size;
and

producing an image feature descriptor by performing an orthogonal transform on an image obtained by said image size process and producing an orthogonal transform coefficient and using said orthogonal transform coefficient as a first group of image feature descriptors. The image retrieval method according to Claim 22, wherein said image size resizing comprises ~~process is composed of~~ a block dividing process of partitioning said image data into blocks, a dominant color calculating process of calculating a dominant color of each of blocks obtained by said block dividing process and an image creating process of creating an image using said dominant color of each of said blocks as a pixel.

24. (*Original*) The image retrieval method according to Claim 23, wherein said image creating process is to extract a color average of entire pixels contained in each of said blocks as said calculated dominant color of each of said blocks.

25. (*Original*) The image retrieval method according to Claim 23, wherein said block dividing process is to partition said image data into 64 blocks.

26. (*Currently Amended*) An image retrieving method for retrieving an image being similar to an inquired image from images stored in an image database, said method comprising:

transforming a first group of image feature descriptors extracted from image data accumulated in said image database and then generating a second group of image feature descriptors to be used for calculating similarity;

transforming a first group of image feature descriptors extracted from image data of said inquired image and then generating a second group of image feature descriptors to be used for calculating similarity;

comparing said second group of image feature descriptors of image data accumulated in said image database with said second group of image feature descriptors of image data of said inquired image to calculate similarity, wherein said first group of image feature descriptors are extracted by resizing image data accumulated in said image database and/or inquired image, of producing a discrete cosine transform coefficient by performing a discrete cosine transform ~~The image retrieval method according to Claim 22, wherein said image feature descriptor producing~~

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. APPLN. NO. 09/732,701
ATTORNEY DOCKET NO. Q62251

~~process is to perform a DCT on an entirety of the resized image obtained by said image size
resizing process and to extract an obtained DCT coefficient and to use said DCT and the
produced discrete cosine transform coefficient being used as an extracted as a first group of
image feature descriptors.~~

21 27. (*Currently Amended*) A storage medium storing a similar-image retrieval program to
cause a computer to carry out retrieval of an image being similar to an inquired image from
images stored in an image database, wherein said similar-image retrieval program comprises:
~~includes a step of~~

~~transforming a first group of image feature descriptors extracted from image data
accumulated in said image database and then generating a second group of image feature
descriptors to be used for calculating similarity, a step of~~

~~transforming a first group of image feature descriptors extracted from image data of said
inquired image and then generating a second group of image feature descriptors to be used for
calculating similarity; and a step of~~

~~comparing said second group of image feature descriptors of image data accumulated in
said image database with said second group of image feature descriptors of image data of said
inquired image to calculate similarity;~~

~~resizing image data accumulated in said image database data and/or inquired image; and
producing an image feature descriptor by performing an orthogonal transform on an
image obtained by said image size process and producing an orthogonal transform coefficient~~

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. APPLN. NO. 09/732,701
ATTORNEY DOCKET NO. Q62251

Q1 and using said orthogonal transform coefficient as a first group of image feature descriptors,
wherein said image size resizing comprises a block dividing process of partitioning said image
data into blocks, a dominant color calculating process of calculating a dominant color of each of
blocks obtained by said block dividing process and an image creating process of creating an
image using said dominant color of each of said blocks as a pixel.
